INK JET RECORDING HEAD

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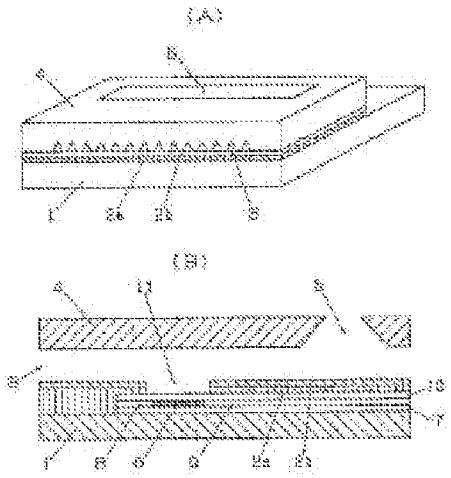
Abstract of **JP 5155024 (A)**

PURPOSE:To improve the jet directional properties of ink droplets by realizing the structure of a flow path in which an ink discharge orifice can be constituted using a material having the same degree of wetting properties. CONSTITUTION:A pit layer is provided on a heater substrate 1, and the pit layer is composed of the first pit layer 2a and the second pit layer 2b. The second pit layer 2b is formed using Si. A channel substrate 4 consists of a channel part or an ink reservoir 5 formed on an Si wafer using an anisotropic etching process. After adhering these two substrates, they are cut and subsequently, a recording head is manufactured. A material encircling a nozzle 3 is entirely Si, and therefore, its wetting properties are identical across the area of the material. Thus it is possible to make the jet directional properties of ink droplets stable.



CLAIMS

[Claim(s)]
[Claim 1]The 1st substrate that has the pit layer by which a crevice where a heating element has been arranged was formed in a pars basilaris ossis occipitalis.
A channel section.
While being the ink jet recording head provided with the above and constituting said pit layer from a film more than two-layer, a film which touches said 2nd substrate consisted of materials with wettability comparable as said 2nd substrate.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]In this invention, ink is heated with a heating element and air bubbles are generated.
Therefore, it is related with the ink jet recording head which breathes out an ink droplet and records on a recording medium.

[0002]
[Description of the Prior Art]Ink is heated with a heating element and the ink jet recording head of the method which generates air bubbles and makes an ink droplet breathe out attracts attention especially in recent years as a recording head which can attain high resolution, small size, and low cost-ization. In the recording head of this method, in order to raise the discharging stability of an ink droplet, a crevice (pit) is provided and what has arranged the heating element at the pars basilaris ossis occipitalis of a crevice is known as indicated to JP,62-33648,A. Although formation of a crevice provides a pit layer on a substrate, patterns the portion of a crevice and is formed, By providing a crevice, the discharging stability of an ink droplet can be raised by limiting the generating region of the air bubbles by which ink was heated and it was generated, and being able to prevent winning of the air from a nozzle.
[0003]Drawing 3 is an explanatory view of an example of an ink jet recording head which has

the pit layer mentioned above.
(A) It is the sectional view cut in the vertical plane where a figure meets a perspective view and the (B) figure meets a channel axis.
the inside of a figure, and 1 -- a heater substrate and 2 -- a pit layer and 3 -- a nozzle and 4 -- a channel substrate and 5 -- as for a common electrode and 9, a heating resistor layer and 7 are [a protective layer and 11] crevices (pit) an individual electrode and 10 an accumulation layer and 8 an ink reservoir and 6. The heater substrate 1 forms the accumulation layer 7, the resistor layer 6, the common electrode 8, the individual electrode 9, the protective layer 10, etc. on a Si wafer, and the pit layer 2 is formed with the photopolymer on it. Although the channel substrate 4 forms in a Si wafer the channel section and the ink reservoir 5 which form an ink passage by anisotropic etching, the neighborhood of a tip part of an ink passage forms the nozzle 3, and the opening serves as an orifice. After carrying out alignment of these both the boards and pasting up, a recording head is produced by cutting for every chip with a dicing saw.
[0004]In such a conventional ink jet recording head, since a nozzle is enclosed by the thermosetting resin which forms a pit layer, and Si which forms a channel section and it is constituted, the nozzle is constituted by the combination of a different material. When an ink droplet was breathed out according to a difference of this material, there was a problem that the jet direction nature of an ink droplet was not stabilized. This is based on a wettable difference of the material which constitutes the ink discharge opening.
For example, the angle of contact which expresses water repellence with the combination of thermosetting resin and Si is because it is about 20 degrees in about 10 degrees and Si, so there is a tendency which an ink droplet can draw near to the large (an angle of contact is small) wettable thermosetting resin side with thermosetting resin.

[0005]In order to improve the jet direction nature of the ink droplet by the cause mentioned above, the trial which processes the ink discharge opening surface with an identical material is also made, but. Since the adhesion over this material to process changed with materials, when it was constituted by the material in which ink discharge openings differ, there was a problem of being easy to produce partial exfoliation.
[0006]
[Problem(s) to be Solved by the Invention]This invention was made in order to solve the problem mentioned above, and in the ink jet recording head which has a pit layer, an object of this invention is to improve the jet direction nature of an ink droplet by realizing passage structure which can constitute an ink discharge opening from material with comparable wettability.
[0007]
[Means for Solving the Problem]A thing, wherein this invention constitutes a film which touches said 2nd substrate while constituting said pit layer from a film more than two-layer from material with wettability comparable as said 2nd substrate in an ink jet recording head which joins the 2nd substrate characterized by comprising the following.

The 1st substrate that has the pit layer by which a crevice where a heating element has been arranged was formed in a pars basilaris ossis occipitalis.
Channel section.
The film which touches said 2nd substrate can consist of metallic materials, such as Si system material and nickel.
[0008]
[Function]The pit layer in which the crevice was formed was considered as the composition more than two-layer, and material with wettability comparable as the 2nd substrate constituted the portion which touches the 2nd substrate from this invention.
Therefore, the wettability of the ink discharge opening circumference can become uniform, and can stabilize the jet direction nature of an ink droplet.

[0009]
[Example]Drawing 1 is an explanatory view of the 1st example of the ink jet recording head of this invention.
(A) It is the sectional view cut in the vertical plane where a figure meets a perspective view and the (B) figure meets a channel axis.
The same numerals were given to the same portion as drawing 3 among the figure. 2a and 2b are pit layers. As for the heater substrate 1, the accumulation layer 7, the heating resistor layer 6, the common electrode 8, the individual electrode 9, the protective layer 10, etc. are formed, and the 1st pit layer 2a and 2nd pit layer 2b are formed on it. Although the channel substrate 4 forms in a Si wafer the channel section and the ink reservoir 5 which form an ink passage by anisotropic etching, the neighborhood of a tip part of an ink passage forms the nozzle 3, and the opening serves as an orifice. After carrying out alignment of these both the boards and pasting up, a recording head is produced by cutting for every chip with a dicing saw.
[0010]Drawing 2 explains the process in which the 1st pit layer 2a and 2nd pit layer 2b are formed, based on a manufacturing process to a heater substrate. First, the accumulation layer 7 which consists of SiO_2 by thermal oxidation is formed on the heater substrate 1 using a Si wafer, film deposition of the heating resistor layer 6 which consists of Poly-Si on it is carried out by CVD, and it patterns after desired shape. Next, film deposition of the aluminum is carried out by sputtering, and the common electrode 8 and the individual electrode 9 are patterned. The protective layer 10 is formed on it. Film deposition of two-layer [of the metal layer which consists of an insulating layer and Ta on it] is carried out, and the protective layer 10 is patterned.
[0011]Then, the 1st pit layer 2a is formed in a thickness of 15 micrometers as a photopolymer using 348 (made by Ciba-Geigy) of Probimide (registered trademark) which is photosensitive polyimide. First, a formation method carries out the spin coat of the photosensitive polyimide varnish, and prebakes it. It is made for the thickness of a photosensitive polyimide varnish layer to be set to 30 micrometers at this time (drawing 2 (A)).
[0012]Next, it patterns by performing exposure and development, and it heats for 2 hours and is

made to heat-harden at 400 ** so that the portion of the crevice 11 may be removed. By this heat-curing process, since the thickness of a polyimide layer decreases 50%, final thickness is set to 15 micrometers (drawing 2 (B)).

[0013]Next, 10 micrometers of solutions of glass resin (trade name: made by U.S. OI-NEG) GR950 of the rudder silicone of an Si system are coated, and it heats for 30 minutes and is made to heat-harden at 250 ** (drawing 2 (C)).

[0014]Then, as the portion of the crevice 11 is exposed, it covers with a resist mask, and the dry etching by the plasma of CF_4/O_2 removes glass resin of the portion of the crevice 11 (drawing 2 (D)).

[0015]Since a channel section and the ink reservoir 5 will be formed in a Si wafer of anisotropic etching as the channel substrate 4 was mentioned above if it returns to drawing 1 and sees about a channel substrate, the surface is Si. However, in practice, the surface of the channel substrate 4 will be in the state of a natural oxidation film, and the SiO_2 film is formed. The angle of contact at that time is about 20 degrees. since the SiO_2 film of the natural oxidation film is formed to some extent, the surface of 2nd pit layer 2b which consists of glass resin of the wettability of the material which constitutes the ink discharge opening is also equivalent -- an angle of contact -- carrying out -- it becomes about 20 degrees too.

[0016]The 2nd example is described. In this example, since the surface will be in the state of a natural oxidation film at the channel substrate 4 which consists of Si and SiO_2 is formed as mentioned above, SiO_2 is used as a material which constitutes 2nd pit layer 2b. Since the manufacturing process is the same as the 1st example, only the manufacturing method of 2nd pit layer 2b is explained here. Process drawing can also be explained using drawing 2.

[0017]On the heater substrate 1 in which the 1st pit layer 2a was formed, the LPD (LiquidPhase Deposition) method is used and 15 micrometers of 2nd pit layer 2bs are formed. After dissolving and filtering SiO_2 particles in silicofluoric acid (H_2SiF_6) solution, the heater substrate 1 in which the 1st pit layer 2a was formed is dipped, and 15-micrometer-thick SiO_2 is formed by adding way acid (drawing 2 (C)).

[0018]Next, the resist mask corresponding to a desired pattern is formed in the SiO_2 surface, and the crevice 11 is formed by the dry etching by CF_4/O_2 plasma (drawing 2 (D)).

[0019]The heater substrate 1 produced as mentioned above is pasted up with the channel substrate 9, it is cut by the dicing saw, and a recording head is created. And also in this example, the wettability of the material which constitutes the ink discharge opening becomes equivalent, and is about 20 degrees in an angle of contact.

[0020]In two examples mentioned above, although 2nd pit layer 2b was formed with Si system material, an angle of contact can also form metallic materials, such as nickel which is about 20 degrees, on the 1st pit layer 2a by plating.

[0021]in addition -- a pit layer is not what is restricted to two-layer -- at least -- two-layer -- with -- it is good. In this case, it is clear that what is necessary is just to use as material with wettability equivalent to a channel substrate material of the top layer formed at the end, i.e., the pit layer which touches a channel substrate.

[0022]
[Effect of the Invention]The pit which forms the crevice which specified the generating region of air bubbles is considered as the composition more than two-layer, and material with wettability equivalent to a channel substrate constitutes the portion which touches a channel substrate from this invention so that clearly from the above explanation.
Therefore, the wettability of the ink discharge opening circumference becomes uniform, and it is effective in the ability of the jet direction nature of an ink droplet to be stabilized.

TECHNICAL FIELD

[Industrial Application]In this invention, ink is heated with a heating element and air bubbles are generated.
Therefore, it is related with the ink jet recording head which breathes out an ink droplet and records on a recording medium.

PRIOR ART

[Description of the Prior Art]Ink is heated with a heating element and the ink jet recording head of the method which generates air bubbles and makes an ink droplet breathe out attracts attention especially in recent years as a recording head which can attain high resolution, small size, and low cost-ization. In the recording head of this method, in order to raise the discharging stability of an ink droplet, a crevice (pit) is provided and what has arranged the heating element at the pars basilaris ossis occipitalis of a crevice is known as indicated to JP,62-33648,A. Although formation of a crevice provides a pit layer on a substrate, patterns the portion of a crevice and is formed, By providing a crevice, the discharging stability of an ink droplet can be raised by limiting the generating region of the air bubbles by which ink was heated and it was generated, and being able to prevent winning of the air from a nozzle.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention]This invention was made in order to solve the problem mentioned above, and in the ink jet recording head which has a pit layer, an object of this invention is to improve the jet direction nature of an ink droplet by realizing passage structure which can constitute an ink discharge opening from material with comparable wettability.

MEANS

[Means for Solving the Problem]A thing, wherein this invention constitutes a film which touches said 2nd substrate while constituting said pit layer from a film more than two-layer from material with wettability comparable as said 2nd substrate in an ink jet recording head which joins the 2nd substrate characterized by comprising the following.
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OPERATION

[Function]The pit layer in which the crevice was formed was considered as the composition more than two-layer, and material with wettability comparable as the 2nd substrate constituted the portion which touches the 2nd substrate from this invention.
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EXAMPLE

[Example]Drawing 1 is an explanatory view of the 1st example of the ink jet recording head of this invention.
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[0015]Since a channel section and the ink reservoir 5 will be formed in a Si wafer of anisotropic etching as the channel substrate 4 was mentioned above if it returns to drawing 1 and sees about a channel substrate, the surface is Si. However, in practice, the surface of the channel substrate 4 will be in the state of a natural oxidation film, and the SiO_2 film is formed. The angle of contact at that time is about 20 degrees. since the SiO_2 film of the natural oxidation film is formed to some extent, the surface of 2nd pit layer 2b which consists of glass resin of the wettability of the material which constitutes the ink discharge opening is also equivalent -- an angle of contact -- carrying out -- it becomes about 20 degrees too.

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the 1st pit layer 2a was formed is dipped, and 15-micrometer-thick SiO_2 is formed by adding way acid (drawing 2 (C)).
[0018]Next, the resist mask corresponding to a desired pattern is formed in the SiO_2 surface, and the crevice 11 is formed by the dry etching by CF_4/O_2 plasma (drawing 2 (D)).
[0019]The heater substrate 1 produced as mentioned above is pasted up with the channel substrate 9, it is cut by the dicing saw, and a recording head is created. And also in this example, the wettability of the material which constitutes the ink discharge opening becomes equivalent, and is about 20 degrees in an angle of contact.
[0020]In two examples mentioned above, although 2nd pit layer 2b was formed with Si system material, an angle of contact can also form metallic materials, such as nickel which is about 20 degrees, on the 1st pit layer 2a by plating.
[0021]in addition -- a pit layer is not what is restricted to two-layer -- at least -- two-layer -- with -- it is good. In this case, it is clear that what is necessary is just to use as material with wettability equivalent to a channel substrate material of the top layer formed at the end, i.e., the pit layer which touches a channel substrate.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is an explanatory view of the 1st example of the ink jet recording head of this invention.
[Drawing 2]It is an explanatory view of the manufacturing process of the heater substrate of drawing 1.
[Drawing 3]It is an explanatory view of an example of the conventional ink jet recording head.
[Description of Notations]
1 A heater substrate, 2 and 2a, and 2b [A heating resistor layer and 7 / An accumulation layer and 8 / A common electrode, nine individual electrodes, and 10 / A protective layer and 11 / Crevice.] A pit layer and 3 A nozzle, 4 channel substrates, and 5 An ink reservoir and 6

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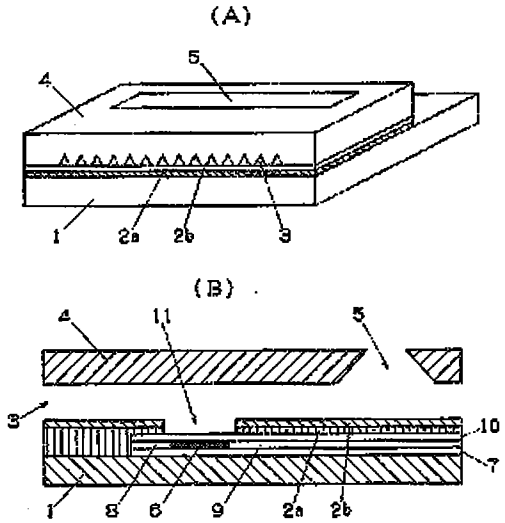
(54)【発明の名称】　インクジェット記録ヘッド

(57)【要約】

【目的】　ピット層を有するインクジェット記録ヘッドにおいて、インク吐出口を同程度の濡れ性を持つ材料で構成できる流路構造を実現することにより、インク滴の噴射方向性を改善する。

【構成】　ヒーター基板１にはピット層が設けられているが、ピット層は第１ピット層２ａと第２ピット層２ｂとで構成されている。第２ピット層２ｂは、Ｓｉで形成される。チャネル基板４は、Ｓｉウェハに異方性エッチングにより、チャネル部やインクリザーバ５が形成されている。これら両基板を接着した後、切断することにより、記録ヘッドが作製される。ノズル３を取り囲む材料は、すべてＳｉであり、インクに対する濡れ性が同一であるから、インク滴の噴射方向性を安定させることができる。



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【特許請求の範囲】

【請求項1】　底部に発熱体が配置された凹部が形成されたピット層を有する第1の基板と、チャネル部を有する第2の基板とを接合してなるインクジェット記録ヘッドにおいて、前記ピット層を2層以上の膜から構成するとともに、前記第2の基板と接する膜を前記第2の基板と同程度の濡れ性を持つ材料で構成したことを特徴とするインクジェット記録ヘッド。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、発熱体によりインクを加熱し、気泡を発生させることにより、インク滴を吐出して記録媒体に記録を行なうインクジェット記録ヘッドに関するものである。

【0002】

【従来の技術】発熱体によりインクを加熱し、気泡を発生させてインク滴を吐出させる方式のインクジェット記録ヘッドは、高解像、小型、低コスト化が図れる記録ヘッドとして近年特に注目されている。この方式の記録ヘッドにおいて、インク滴の吐出安定性を向上させるために、特開昭62－33648号公報に記載されているように、凹部（ピット）を設け、凹部の底部に発熱体を配置したものが知られている。凹部の形成は、基板上にピット層を設け、凹部の部分をパターニングして形成されるが、凹部を設けることによって、インクが加熱されて発生した気泡の発生領域が限定され、また、ノズルからの空気の抱き込みを防止できることにより、インク滴の吐出安定性を向上させることができる。

【0003】図3は、上述したピット層を有するインクジェット記録ヘッドの一例の説明図であり、（A）図は斜視図、（B）図はチャネル幅に沿う垂直面で切った断面図である。図中、1はヒーター基板、2はピット層、3はノズル、4はチャネル基板、5はインクリザーバ、6は発熱抵抗体層、7は蓄熱層、8は共通電極、9は個別電極、10は保護層、11は凹部（ピット）である。ヒーター基板1は、Siウェハ上に蓄熱層7、抵抗体層6、共通電極8、個別電極9、保護層10などを形成し、その上に、感光性樹脂により、ピット層2が形成されている。チャネル基板4は、Siウェハに異方性エッチングによって、インク流路を形成するチャネル部やインクリザーバ5を形成したものであるが、インク流路の先端部近傍は、ノズル3を形成し、その開口がオリフィスとなる。これら両基板を位置合わせして接着した後、ダイシングソーによって各チップごとに切断することにより、記録ヘッドが作製される。

【0004】このような従来のインクジェット記録ヘッドにおいては、ノズルは、ピット層を形成する熱硬化性樹脂と、チャネル部を形成するSiとにより取り囲まれて構成されるから、ノズルは、異なる材料の組み合わせにより構成されている。この材料の相違により、インク滴を吐出した時に、インク滴の噴射方向性が安定しないという問題があった。これは、インク吐出口を構成している材料の濡れ性の相違によるものであり、例えば、熱硬化性樹脂とSiの組み合わせでは、撥水性を表す接触角は、熱硬化性樹脂で約10°、Siで約20°であるため、濡れ性の大きい（接触角の小さい）熱硬化性樹脂側にインク滴が引き寄せられる傾向があるからである。

2

【0005】上述した原因によるインク滴の噴射方向性を改善するため、インク吐出口表面を同一材料で処理する試みもなされているが、この処理する材料に対する密着性が材料により異なるため、インク吐出口が異なる材料により構成されていると、部分的な剥離が生じやすいという問題があった。

【0006】

【発明が解決しようとする課題】本発明は、上述した問題点を解決するためになされたもので、ピット層を有するインクジェット記録ヘッドにおいて、インク吐出口を同程度の濡れ性を持つ材料で構成できる流路構造を実現することにより、インク滴の噴射方向性を改善することを目的とするものである。

【0007】

【課題を解決するための手段】本発明は、底部に発熱体が配置された凹部が形成されたピット層を有する第1の基板と、チャネル部を有する第2の基板とを接合してなるインクジェット記録ヘッドにおいて、前記ピット層を2層以上の膜から構成するとともに、前記第2の基板と接する膜を前記第2の基板と同程度の濡れ性を持つ材料で構成したことを特徴とするものである。前記第2の基板と接する膜は、Si系材料、Ni等の金属材料で構成することができる。

【0008】

【作用】本発明によれば、凹部が形成されたピット層を2層以上の構成とし、第2の基板と接する部分を、第2の基板と同程度の濡れ性を持つ材料で構成したことにより、インク吐出口周辺の濡れ性が均一になり、インク滴の噴射方向性を安定させることができる。

【0009】

【実施例】図1は、本発明のインクジェット記録ヘッドの第1の実施例の説明図であり、（A）図は斜視図、（B）図はチャネル幅に沿う垂直面で切った断面図である。図中、図3と同様な部分には同じ符号を付した。2a、2bはピット層である。ヒーター基板1は、蓄熱層7、発熱抵抗体層6、共通電極8、個別電極9、保護層10などが形成され、その上に、第1ピット層2a、第2ピット層2bが形成されている。チャネル基板4は、Siウェハに異方性エッチングにより、インク流路を形成するチャネル部やインクリザーバ5を形成したものであるが、インク流路の先端部近傍は、ノズル3を形成し、その開口がオリフィスとなる。これら両基板を位置合わせして接着した後、ダイシングソーによって各チッ

ブごとに切断することにより、記録ヘッドが作製される。

【００１０】図２は、ヒーター基板へ第１ビット層２ａおよび第２のビット層２ｂを形成する過程を、製造工程に基づいて説明するものである。まず、Ｓｉウェハを用いたヒーター基板１上に、熱酸化によりSiO_2からなる蓄熱層７を形成し、その上にＰｏｌｙ－Ｓｉからなる発熱抵抗体層６をＣＶＤにより着膜し、所望の形状にパターニングする。次に、Ａｌをスパッタリングにより着膜し、共通電極８、個別電極９をパターニングする。さらに、その上に、保護層１０を形成する。保護層１０は、絶縁層とその上のＴａよりなる金属層の２層が着膜され、パターニングされたものである。

【００１１】続いて、感光性樹脂として、感光性ポリイミドであるＰｒｏｂｉｍｉｄｅ（登録商標）の３４８（Ｃｉｂａ－Ｇｅｉｇｙ社製）を用いて、第１ビット層２ａを１５μｍの厚さに形成する。形成方法は、まず、感光性ポリイミドワニスをスピンコートし、プリベークする。このとき、感光性ポリイミドワニス層の厚さは、３０μｍとなるようにする（図２（Ａ））。

【００１２】次に、凹部１１の部分が除去されるように、露光、現像を行なって、パターニングして、４００℃で２時間加熱して熱硬化させる。この熱硬化工程によって、ポリイミド層の膜厚は、５０％減少するから、最終的な膜厚は、１５μｍとなる（図２（Ｂ））。

【００１３】次に、Ｓｉ系のラダーシリコーンのグラスレジン（商品名：米国ＯＩ－ＮＥＧ社製）ＧＲ９５０の溶液を１０μｍコーティングし、２５０℃で３０分間加熱して、熱硬化させる（図２（Ｃ））。

【００１４】その後、凹部１１の部分を露出するようにしてレジストマスクで覆い、凹部１１の部分のグラスレジンを、CF_4/O_2のプラズマによるドライエッチングによって除去する（図２（Ｄ））。

【００１５】図１に戻って、チャネル基板についてみると、チャネル基板４は、上述したように、Ｓｉウェハに異方性エッチングにより、チャネル部やインクリザーバ５が形成されたものであるから、その表面はＳｉである。しかし、実際は、チャネル基板４の表面は、自然酸化膜の状態となり、SiO_2膜が形成されている。その時の接触角は、約２０°である。グラスレジンよりなる第２ビット層２ｂの表面も、自然酸化膜のSiO_2膜がある程度形成されているため、インク吐出口を構成している材料の濡れ性は同等で、接触角としは、やはり約２０°となる。

【００１６】第２の実施例について説明する。この実施例では、上述したように、Ｓｉよりなるチャネル基板４に表面が自然酸化膜の状態となり、SiO_2が形成されることから、第２ビット層２ｂを構成する材料として、SiO_2を使用するものである。製造工程は、第１の実施例と同じであるので、ここでは、第２ビット層２ｂの作製方法のみを説明する。工程図も図２を用いて説明できる。

【００１７】第１ビット層２ａが形成されたヒーター基板１上に、ＬＰＤ（Ｌｉｑｕｉｄ Ｐｈａｓｅ Ｄｅｐｏｓｉｔｉｏｎ）法を用いて第２ビット層２ｂを１５μｍ形成する。珪弗化水素酸（H_2SiF_6）水溶液に、SiO_2粒子を溶解、過飽した後、第１ビット層２ａが形成されたヒーター基板１を浸漬し、ほう酸を添加することによって厚さ１５μｍのSiO_2を形成する（図２（Ｃ））。

【００１８】次に、SiO_2表面に、所望のパターンに対応したレジストマスクを形成し、CF_4/O_2プラズマによるドライエッチングによって、凹部１１を形成する（図２（Ｄ））。

【００１９】以上のようにして作製されたヒーター基板１は、チャネル基板９と接着され、ダイシングソーで切断されて記録ヘッドが作成される。そして、この実施例においても、インク吐出口を構成している材料の濡れ性は同等となり、接触角で約２０°である。

【００２０】上述した２つの実施例では、第２ビット層２ｂをＳｉ系材料で形成したが、接触角が約２０°であるＮｉ等の金属材料を、メッキにより第１ビット層２ａの上に形成することもできる。

【００２１】なお、ビット層は２層に限られるものではなく、少なくとも２層あればよい。この場合、最後に形成される最上層、すなわち、チャネル基板と接するビット層の材料をチャネル基板と同等の濡れ性を持つ材料とすればよいことは明らかである。

【００２２】

【発明の効果】以上の説明から明らかなように、本発明によれば、気泡の発生領域を規定した凹部を形成するビットを２層以上の構成とし、チャネル基板と接する部分をチャネル基板と同等の濡れ性を持つ材料で構成されるので、インク吐出口周辺の濡れ性が均一になり、インク滴の噴射方向性を安定できるという効果がある。

【図面の簡単な説明】

【図１】　本発明のインクジェット記録ヘッドの第１の実施例の説明図である。

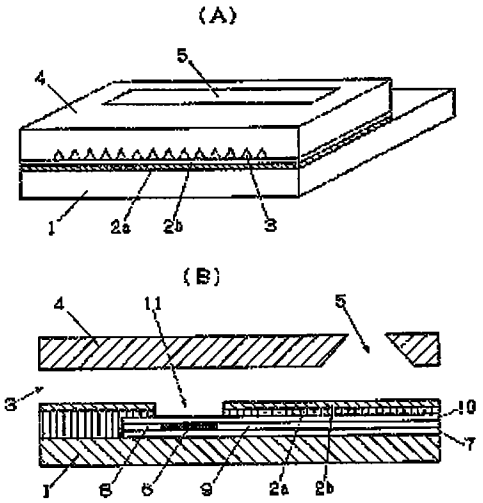
【図２】　図１のヒーター基板の製造工程の説明図である。

【図３】　従来のインクジェット記録ヘッドの一例の説明図である。

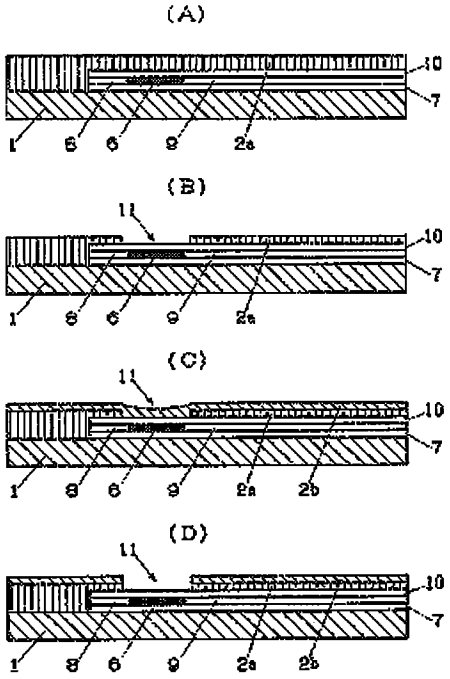
【符号の説明】

１　ヒーター基板、２，２ａ，２ｂ　ビット層、３　ノズル、４　チャネル基板、５　インクリザーバ、６　発熱抵抗体層、７　蓄熱層、８　共通電極、９個別電極、１０　保護層、１１　凹部。

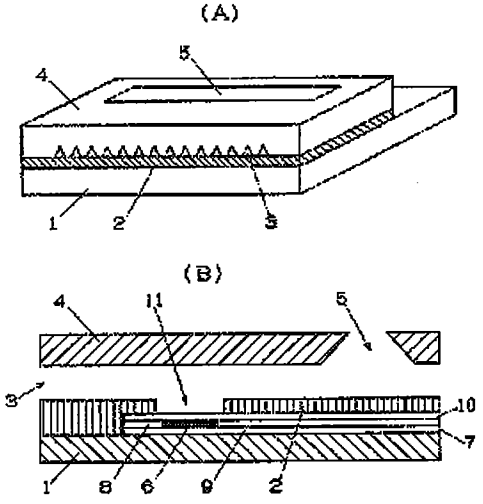
【図1】



【図2】



【図3】



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